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## INCMS™ Technical Overview

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## 1 Introduction

Sitemorse provides best-of-breed control of site quality. Content management systems can provide best-of-breed control over the process of content creation and management. Combining Sitemorse capabilities within a CMS environment is needed to streamline the process of publishing and content control. There is very little overlap between what a CMS does and what Sitemorse provides. They do not have competing functionality. They are complementary systems. The CMS is responsible for the timely publication and content management process whilst Sitemorse provides an external service running on a continuous basis to detect matters that effect visitor experience or, as is often the case, in supporting implementing changes required say following a brand, product or service change or regulatory need.

Rather than having to deal with multi systems, the Sitemorse **INCMS™** delivers the capability within the CMS, works under the CMS and ensures the consistent application of standards and control by generating consolidated reporting for key performance indicators and performance.

Sitemorse performs assessments of web pages within one or more sites. This assessment provides confidence that the content on a site is of a sufficiently high quality.

The Sitemorse **INCMS™** enables content managers and editors within a content management system to perform Sitemorse tests on their content before it is published. This ensures the quality of the published content meets a high standard. It allows, content managers to test pages and content as they are being modified as well as having access to their existing familiar Sitemorse reports.

Rather than compete with any existing checking mechanism within a CMS, Sitemorse **INCMS™** augments the existing CMS functionality. The specialist assessment that Sitemorse **INCMS™** provides checks the pages as it is seen by a site visitor, not as previewed by a content manager. Although all CMSs try to provide a content preview that is an accurate representation of what a site visitor would see, this must be done within the confines of the CMS, so it is never a perfect representation of the site visitor view. When Sitemorse **INCMS™** assesses a page, it does so as though it was a site visitor by evaluating the page from outside the CMS including any automated content elements, and links within documents such as PDFs. This is a far more accurate representation of what a site visitor would see. The Sitemorse CMS Integration goes beyond any checking provided by the CMS.

As well as testing one content item at a time, Sitemorse **INCMS™** allows multiple pages to be tested. For example, a list of pages that were changed in the last 24 hours can be submitted and Sitemorse will test each page. This could be run as an automatic daily or weekly scheduled operation that provides an assurance that the site quality is being maintained. The content manager who made the last change can be included in the list of pages, so any errors can be fed back to the responsible content manager directly.

In providing this facility, the communications between the CMS and the Sitemorse servers must be strictly controlled whilst ensuring no additional hardship for content managers. All communications must be initiated from within the CMS and thus within the customer's secure infrastructure behind the firewall. It is not acceptable for an external server to initiate a connection to a CMS from outside the customer's secure infrastructure as this introduces the potential for a security breach. All communications are encrypted by default.

Whilst providing the high level of security it is essential that the process of testing the content is not burdensome for the content manager. Sitemorse stores a license key inside the CMS. This means the CMS integration handles authentication and the content manager does not have to authenticate with Sitemorse. If the content manager is authenticated with the CMS (which will be the case if content is being edited), then they are also authenticated with Sitemorse. In effect, the CMS is authenticated with Sitemorse through the license key.

As well as testing one content item at a time, **INCMS™** allows multiple pages to be tested. For example, a list of pages that were changed in the last 24 hours can be submitted and Sitemorse will test each page. This could be run as an automatic daily or weekly scheduled operation that provides an assurance that the site quality is being maintained. The content manager who made the last change can be included in the list of pages, so any errors can be fed back to the responsible content manager directly.

### 3 Quality and Assessment as Part of Content Editing

One of the main objectives of the Sitemorse **INCMS™** is to provide all the facilities that Sitemorse provides for quality and compliance but provide this in an interface with which the content manager is already familiar. The key to this is to make the client side of the CMS Integration a standard plug-in or module for the CMS. This means that every client is different as it is tailored to the individual CMS.

#### 3.1 Sitemorse as Part of the Content Management Process

The process of managing content within a CMS is usually controlled by a workflow process. This can be a very simple publish/not publish as in WordPress or a multi-stage process that is more typical of a high-end CMS. The following diagram shows a typical workflow process for simple content approval.

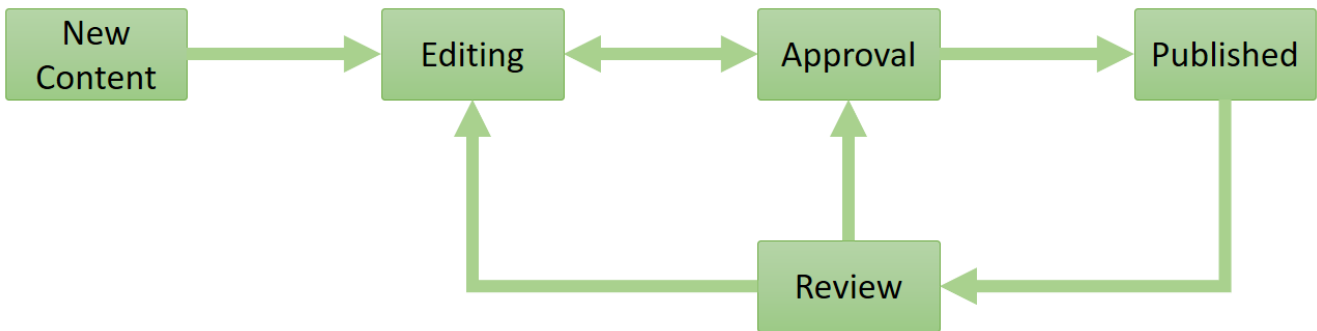


Figure 1 - Typical Workflow in a CMS

The content is created then iterates between editing and approval states where, typically, the text of the content is checked and very little else. In some more advanced CMSs, there might be some basic accessibility testing. Although this workflow process in the CMS is designed to improve the quality of the content published, it still allows for content be published that contains harder-to-detect errors. After publication, content is usually reviewed from time to time.

The following diagram shows the same workflow with the Sitemorse **INCMS™** included in the process.

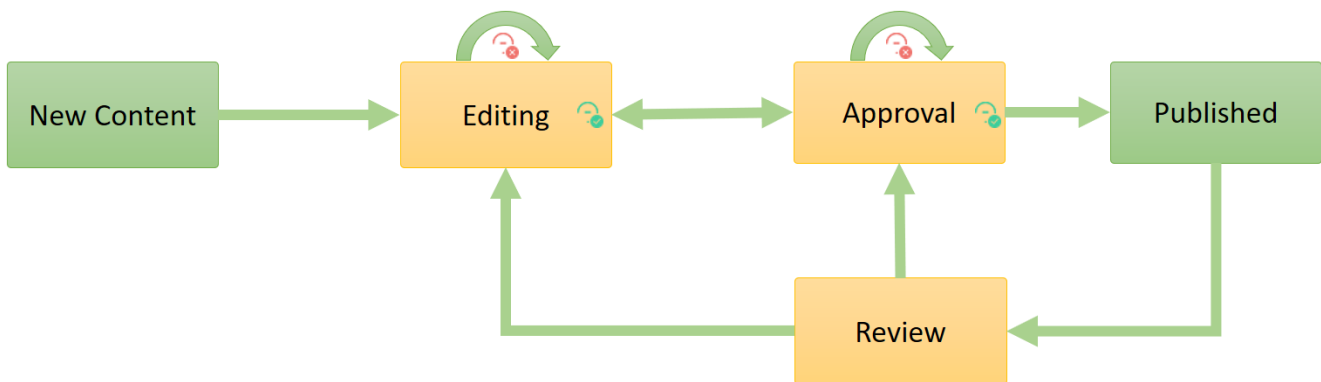


Figure 2 - Typical Workflow with Sitemorse **INCMS™**

The Sitemorse **INCMS™** allows content managers to assess the quality of a page at each state in workflow as well as ensuring the content is performing well and does not infringe brand guidelines. The above diagram shows assessment and correction in both the editorial and approval workflows states. Some approvers can be given permission to publish even if all assessment tests are not passed if this is required. The above workflow greatly improves the quality of the published page.

Once content has been published, its quality can degrade even though the page has not changed. For example, take a page with links to other content that is not controlled by the CMS. This might be pages generated through other means or pages on external sites. At the time the content was published by the CMS, all the links were valid however, as time goes by, external pages might move or be removed. The pages created by the CMS now have broken links and these links need to be corrected. Sitemorse clients can have their published content assessed periodically to check for just this sort of problem. This service is Sitemorse Continuous Content Assessment™. The following diagram shows how Sitemorse Continuous Content Assessment™ could be used to create workflow tasks for content managers.

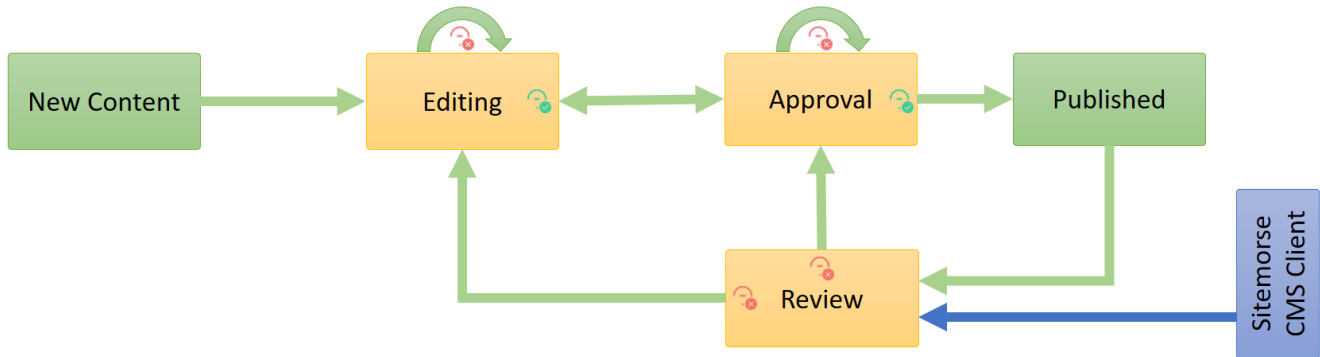


Figure 3 - Workflow Task List

Here, rather than creating a to-do list for each content manager, the content item’s workflow state is change so it appears in a workflow task list for the appropriate content manager.

All the above examples are how Sitemorse **INCMS™** can be used to enable the content manager to work entirely within the CMS whilst still ensuring the content quality through Sitemorse. These examples also show how a CMS vendor can utilise the Sitemorse service to provide a fuller service to their customer and allow their customer to maximise the investment they have made.

### 3.2 CMS Examples

Although each CMS differs in the facilities it provides and the layout of the UI, it is important that each content manager can have Sitemorse assess content without it impeding their ability to use the CMS in their usual way.

As examples, the following is for the WordPress client where the Sitemorse test is initiated manually using the button highlighted.

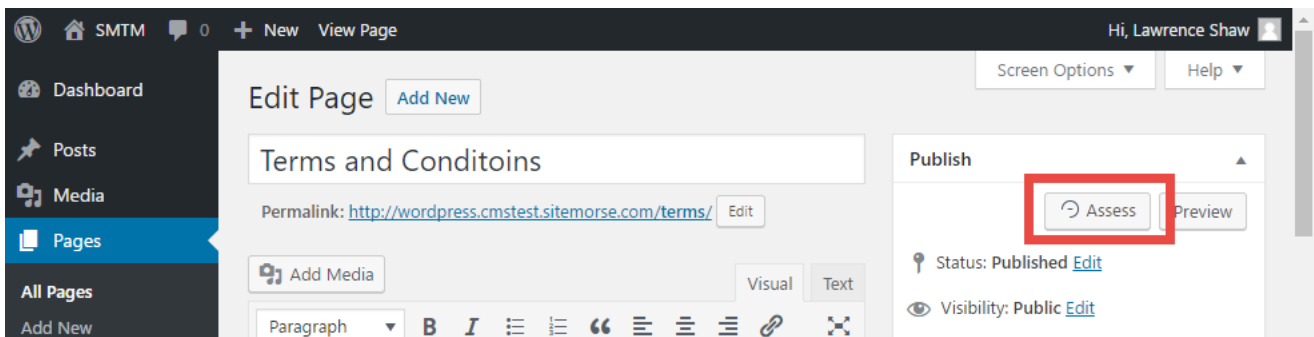


Figure 4 - WordPress editorial interface

As another example, the following is for Drupal with the Sitemorse button highlighted

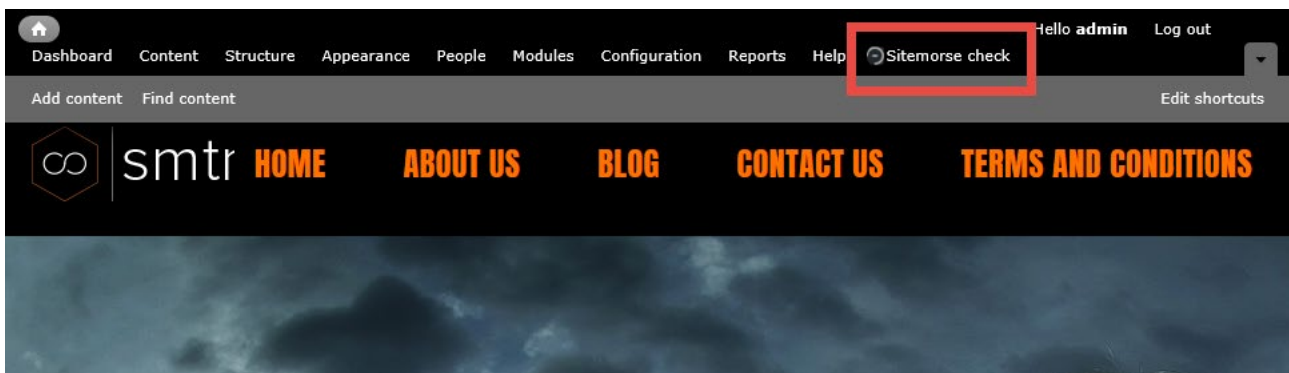


Figure 5 - Drupal Editorial Interface

As a third example, here is the same button highlighted in Sitecore.

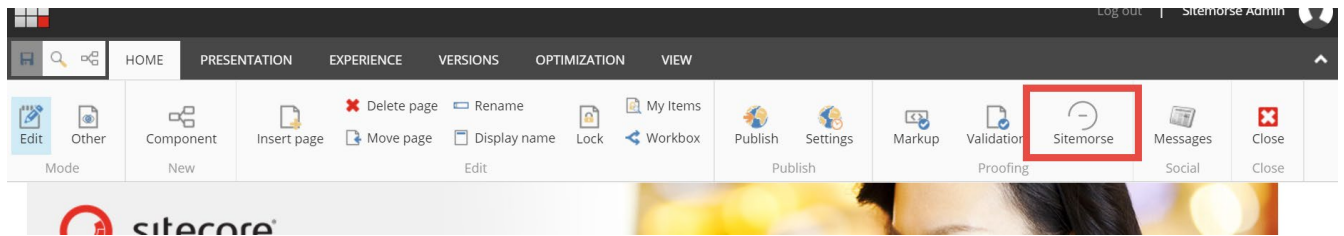


Figure 6 - Sitecore Editorial Interface

Although each of these UIs looks very different, they have a common business benefit. Each of these examples, provides the Sitemorse facility exactly where a content manager would expect to see it. This minimizes the amount of training required for content managers as content checking becomes a standard part of their business process of creating, checking, and publishing content.

#### 4 Free tier licences and paid tier licences

Sitemorse INCMS™ licences can be obtained online from Sitemorse.com. There are two types of licence. The free tier licence allows a small number of page tests per month. This type of licence is ideal for testing the service either as an evaluation or from a development/test server. It might even be sufficient for a small publishing operation.

Paid tier licences have no restriction on the number of page tests, but they are restricted by the number of users. The paid tier can be for a fixed term or a monthly fee.

Both free and paid tier licences require a user identifier when the page test is requested by the CMS. If user information is not supplied with the test request, the test will be rejected.

Before any licence for the free or paid tier can be used, it must be verified with a secure POST request containing the licence key.

One of the key advantages of passing a user identifier as part of a page test is you can keep track of which users make use of Sitemorse, how often, what they are testing and when. It allows you to discover which users are trying to test pages but have been rejected due to licence limits. This information is emailed every month with a link to detailed reporting pages.

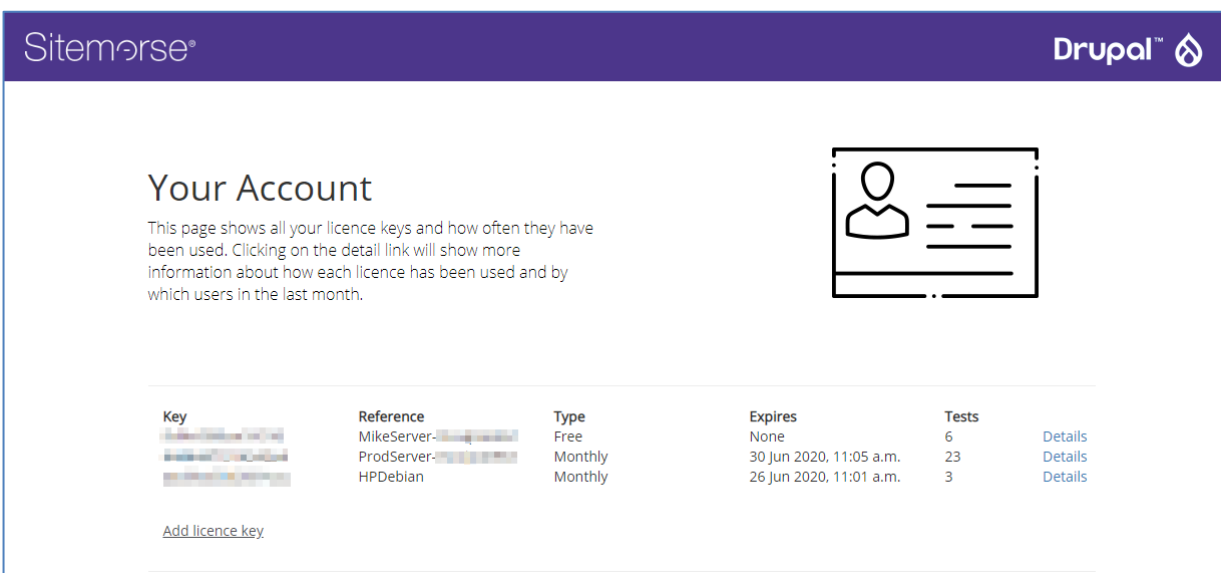


Figure 7 - report showing activity for all licences

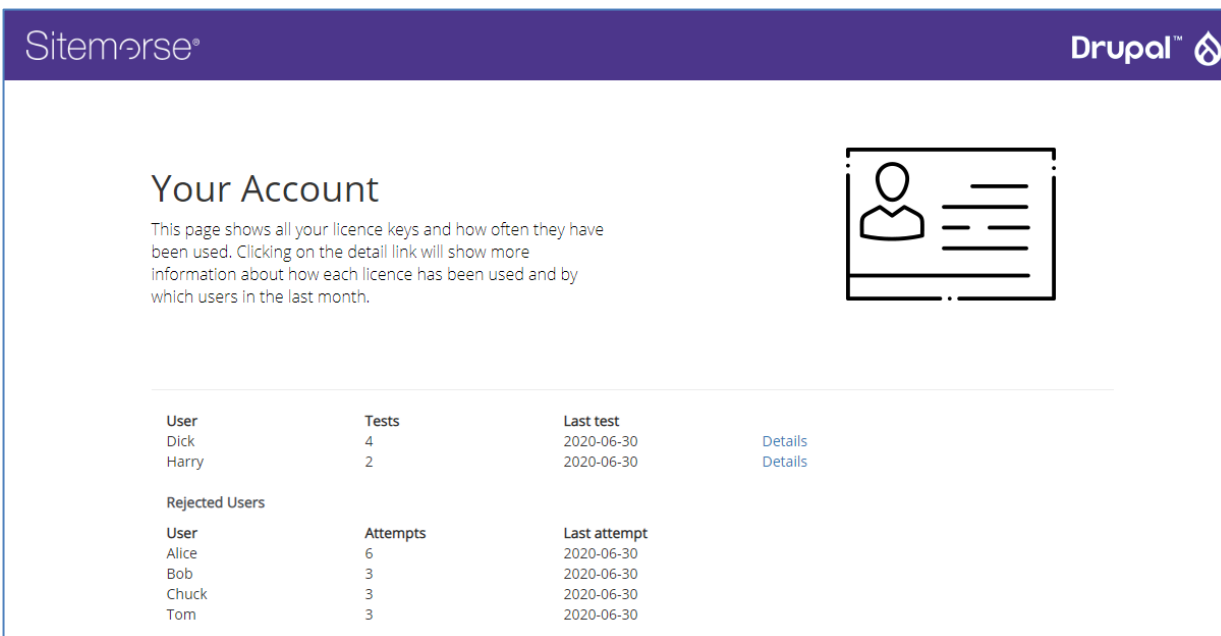


Figure 8 - report showing user activity

## 5 Secure Communications

It is important that any customer who runs a CMS is very confident that modules within the CMS do not compromise security. Even if a security breach only reveals content that will eventually be published to the public web site, the adverse publicity associated of a security breach of any kind is undesirable. For this reason, it is important that customers understand how the Sitemorse INCMS™ works with respect to the flow of messages and how these are initiated.

In the follow diagrams and notes, error handling and some of the message detail has been omitted for clarity. It is important to note that the default for all communications is an encrypted SSL connection.

### 5.1 Authentication

The following diagram summarises the authentication stage message flow.

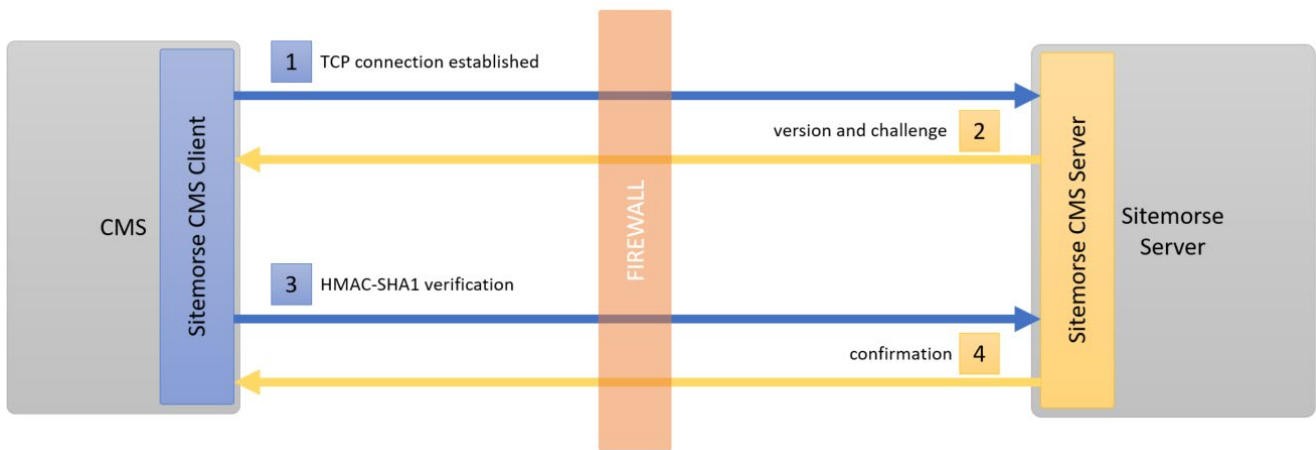


Figure 9 - Authentication Messages

1. The Sitemorse CMS Client initiates a TCP connection from within the customer CMS and behind the customer’s firewall
2. The Sitemorse Server responds with a version number and an opaque challenge string of 8 to 64 characters
3. The client uses parts of the key combined with the challenge to create an HMAC-SHA1 string
4. The server confirms the HMAC-SHA1 string is correct

As only the client and the server have a copy of the license key, only the true client and server can generate the same HMAC-SHA1 string. The content manager is not involved in this process. There is no need for the content manager to authenticate with Sitemorse to conduct a test. No additional passwords need be remembered. If the content manager is authenticated with the CMS, and they can perform a Sitemorse test.

### 5.2 Test Request

Once the authentication phase is complete, the client can send the content for testing. The following diagram shows how the client initiates the test.

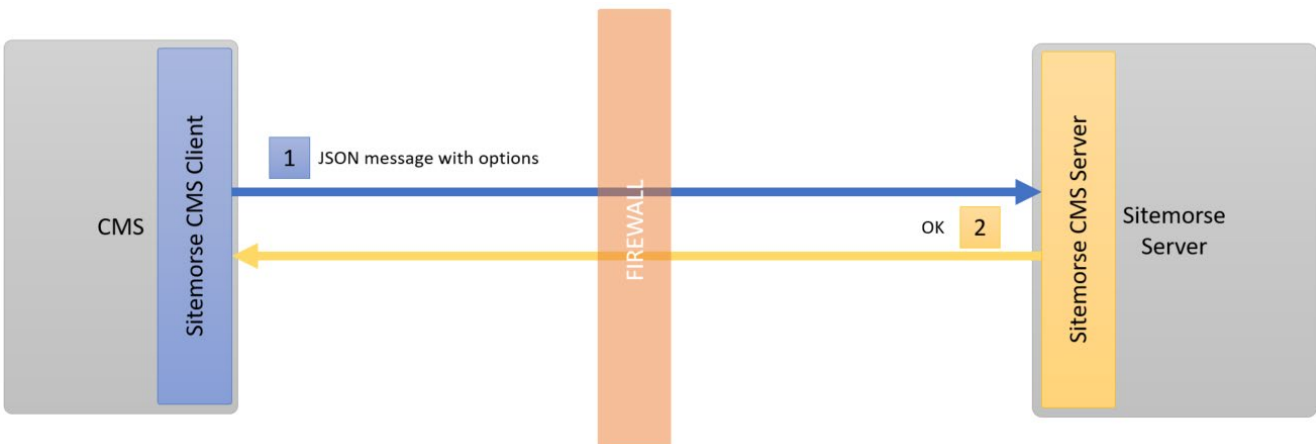


Figure 10 - Test Request Messages



1. The client creates a JSON message containing the information about what is to be tested. This message includes the URL, hostnames, how the result is to be viewed and many more optional parameters. The client sends the length of the message and the message
2. The server responds with OK

The client message contains a list of hostnames that are behind the firewall. This tells the Sitemorse server which items need to be retrieved through the client and which can be retrieved from a public site. For example, the content being tested might be in the CMS but links to images or CSS might be on the public web site.

### 5.3 HTTP Proxy

After the test request, the client enters the HTTP proxy stage. The server needs to request the HTML to be tested and then any images, CSS, JavaScript, etc. The client now acts as a proxy for the server to allow the server to obtain all the required items. The client can reject any request that falls outside the pre-agreed hostname, port number, etc. Although the server is requesting content, the client still maintains the required level of security.

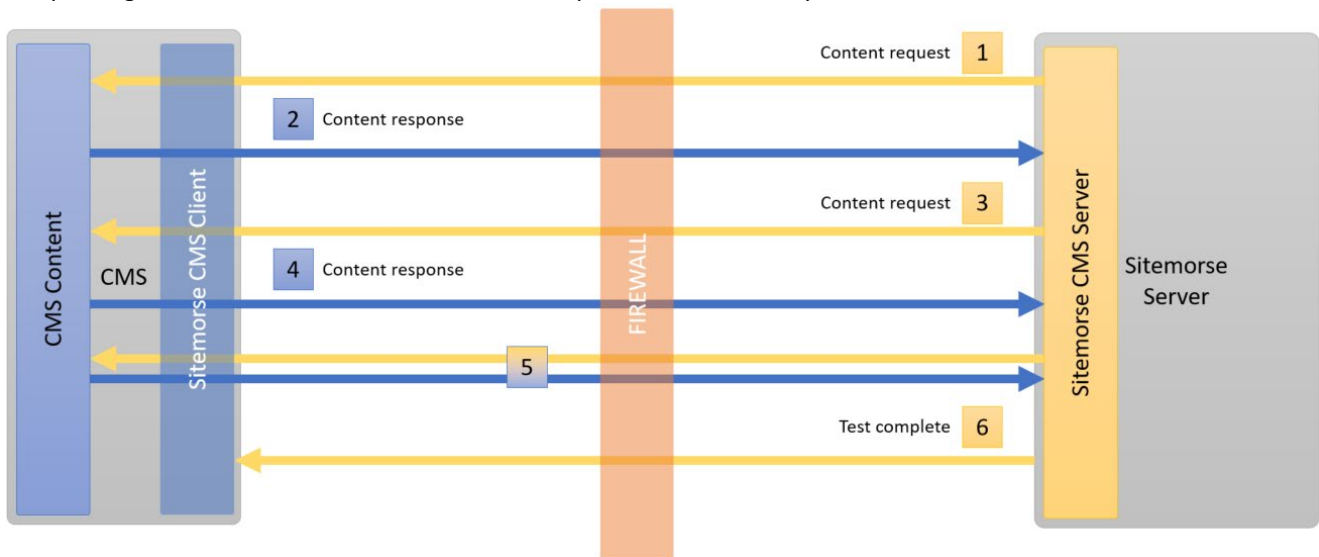


Figure 11 - HTTP Proxy Messages

1. The server sends a request for content
2. The client obtains the content locally and responds
3. The server sends a request for content
4. The client obtains the content locally and responds
5. The request/response process is carried out until all the required items have been obtained by the server
6. The server sends a test complete message with the URL of the page that contains the test results and information about any errors on the page

Note that often links for images and CSS might be from public servers and these are not shown in the diagram for clarity.

The status of the errors on the page returned in the last step above, can be used to update content lists within the CMS. For example, the following screen shot shows the Drupal CMS content search UI with an added column to show the result of the last assessment done.

Home » Administration

[+ Add content](#)

**SHOW ONLY ITEMS WHERE**

status

type

**UPDATE OPTIONS**

<input type="checkbox"/>	TITLE	TYPE	AUTHOR	STATUS	SITEMORSE	UPDATED	OPERATIONS
<input type="checkbox"/>	Contact us <span style="color:red">updated</span>	Basic page	admin	published		04/25/2017 - 18:09	<a href="#">edit</a> <a href="#">delete</a>
<input type="checkbox"/>	Privacy Policy <span style="color:red">new</span>	Basic page	michelle	published		04/25/2017 - 13:34	<a href="#">edit</a> <a href="#">delete</a>
<input type="checkbox"/>	Terms and Conditions	Basic page	admin	published		04/25/2017 - 10:16	<a href="#">edit</a> <a href="#">delete</a>
<input type="checkbox"/>	About us	Basic page	admin	published		04/23/2017 - 13:50	<a href="#">edit</a> <a href="#">delete</a>
<input type="checkbox"/>	Events	Basic page	admin	published		04/17/2017 - 14:12	<a href="#">edit</a> <a href="#">delete</a>
<input type="checkbox"/>	Blog	Basic page	admin	published		09/07/2016 - 16:26	<a href="#">edit</a> <a href="#">delete</a>
<input type="checkbox"/>	PERFECT-PEARLS	Article	admin	published		07/18/2016 - 10:56	<a href="#">edit</a> <a href="#">delete</a>

Figure 12 - Drupal UI with Sitemorse Assessment Status

## 6 LIVE – released content, Continuous Assessment (Automatic Testing)

Sometimes content is created manually and not tested or content is generated automatically. In this case, it is useful to test pages at regular intervals on a scheduled basis. For example, each day you might want to test all the pages that have changed in the last 24 hours or you might want to send all updated pages to Sitemorse Record & Retrieve as a permanent record of site changes. The Sitemorse CMS Integration caters for multi-page testing.

First let us consider a process on the CMS that uses the Sitemorse **INCMS™** to notify the Sitemorse Server of changes. When the client sends a test request to the server, optionally, the test request can contain a list of pages rather than a single page. The server will process each of these pages in the same way a single page is processed. If the pages are listed in the hostnames object of the list, the page is obtained through the client proxy. This could be for pages that are published to an intranet not accessible publicly. If the pages are not listed in the hostnames object, then these are publicly available. For example, each day updated pages might be published to a delivery system which is public and a process in the CMS uses the Sitemorse CMS Integration to tell the Sitemorse Server to test the new pages on the delivery system. The following diagram illustrates this.

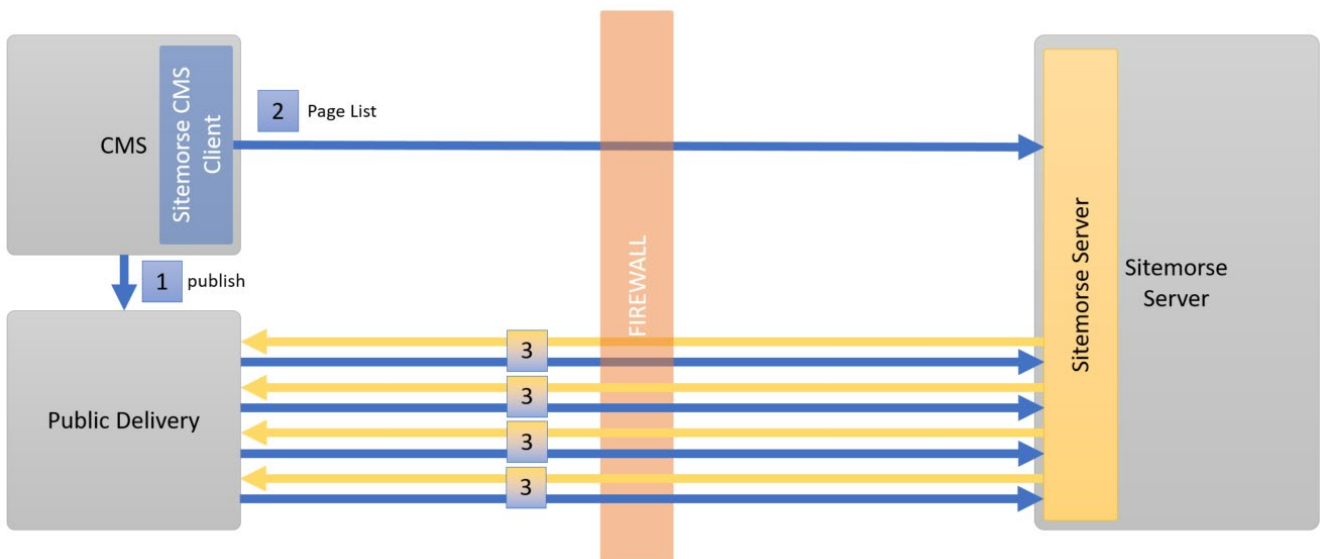


Figure 13 - Sending a list of updated pages

1. CMS publishes new content to the public delivery system
2. CMS process uses the Sitemorse Client to send a list of published pages to the Sitemorse Server
3. Sitemorse Server tests all the pages in the list (requests for images/CSS/etc. not shown for clarity)

Secondly, let us consider a publicly available delivery system but no notification from a process on the CMS. A typical example might be a page or process that has been developed on the CMS delivery system that can return a list of pages in the JSON format used to send page lists.

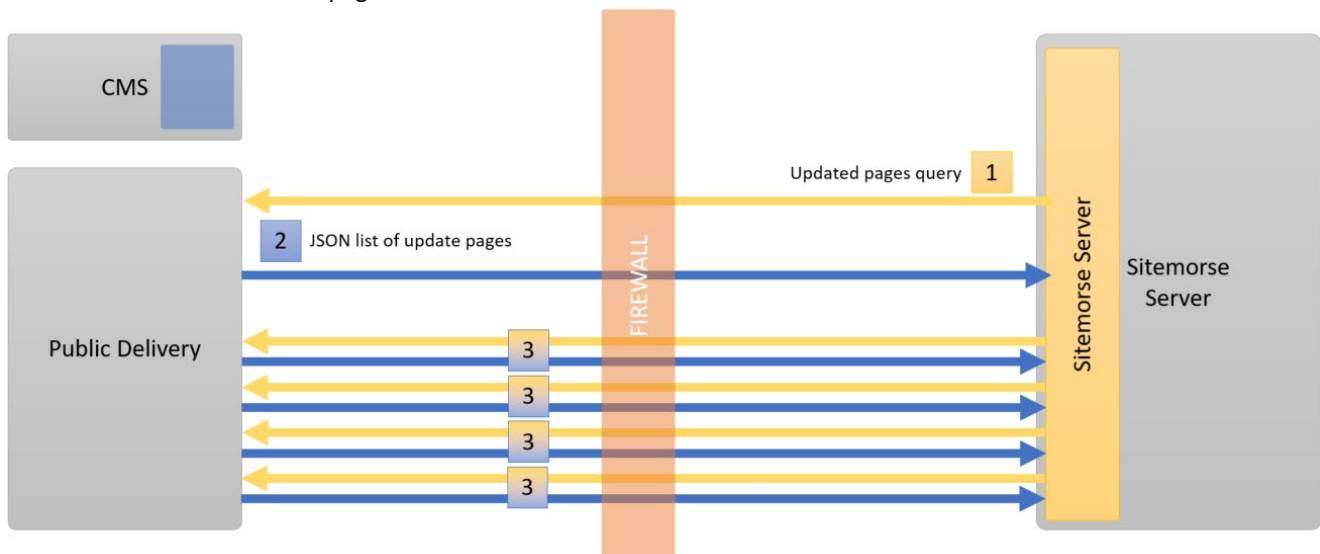


Figure 14 - Querying a list of updated pages

1. Sitemorse Server queries the public delivery server for a list of updated pages
2. A dynamic list is returned from the delivery system
3. Sitemorse Server tests all the pages in the list

## 7 Installation and Configuration

It is essential to present UIs to content managers with which they are already familiar, and it is equally true that this applies to administrators. No administrator wants to install or configure a module in a completely different way to the other modules with which they are already familiar.

Sitemorse **INCMS™** modules for each CMS are built to conform to best practices for each CMS. As an example, the Drupal module for Sitemorse **INCMS™** is installed by extracting the module into the sites/all/modules folder. The module is accessed from the admin bar modules tab. The following diagram shows how the module appears alongside the other modules to the administrator.

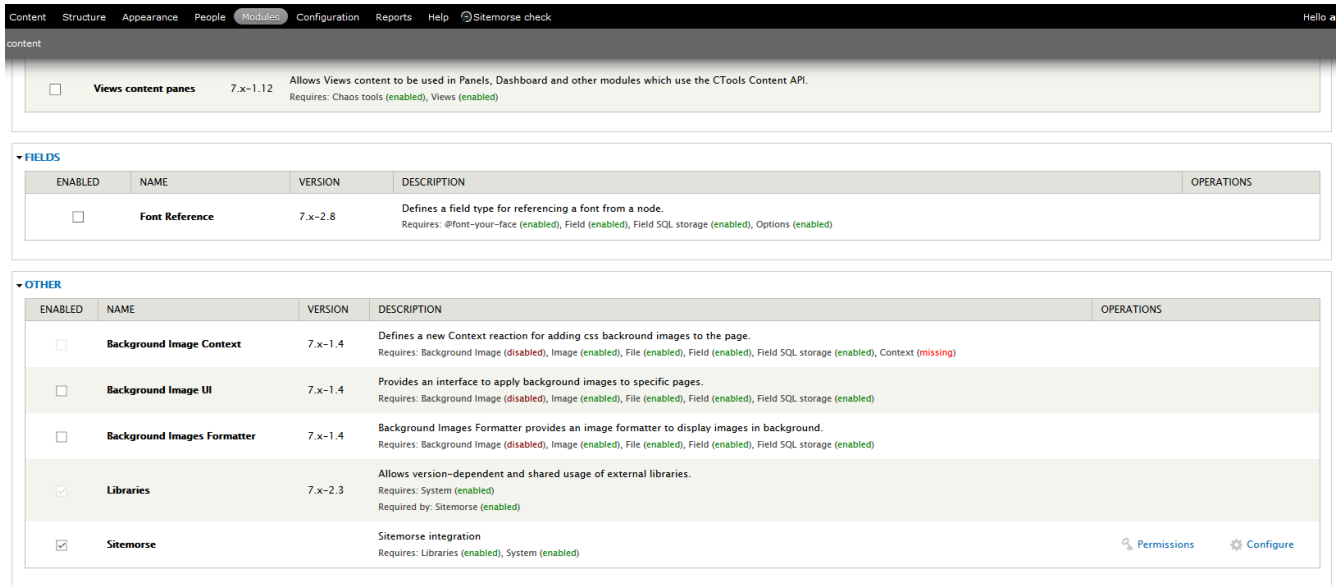


Figure 15 - Drupal Module Configuration

This process of installation and access to the module is entirely familiar to a Drupal administrator.

Compare this to how a WordPress administrator views the installed Sitemorse CMS Integrations plugin.

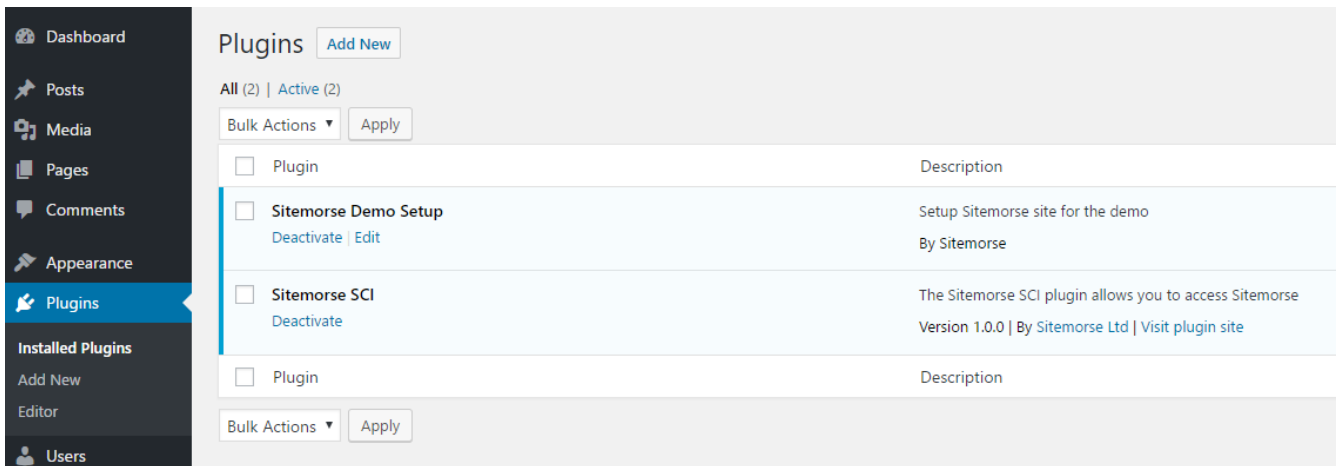


Figure 16 - WordPress Plugin Configuration

There will be specific information that needs to be set for the module/plugin, but this is the case will all modules as each provides specific functionality. In the case of Sitemorse **INCMS™**, the configuration is very simple with only a few fields to be added, the key one being the license key.

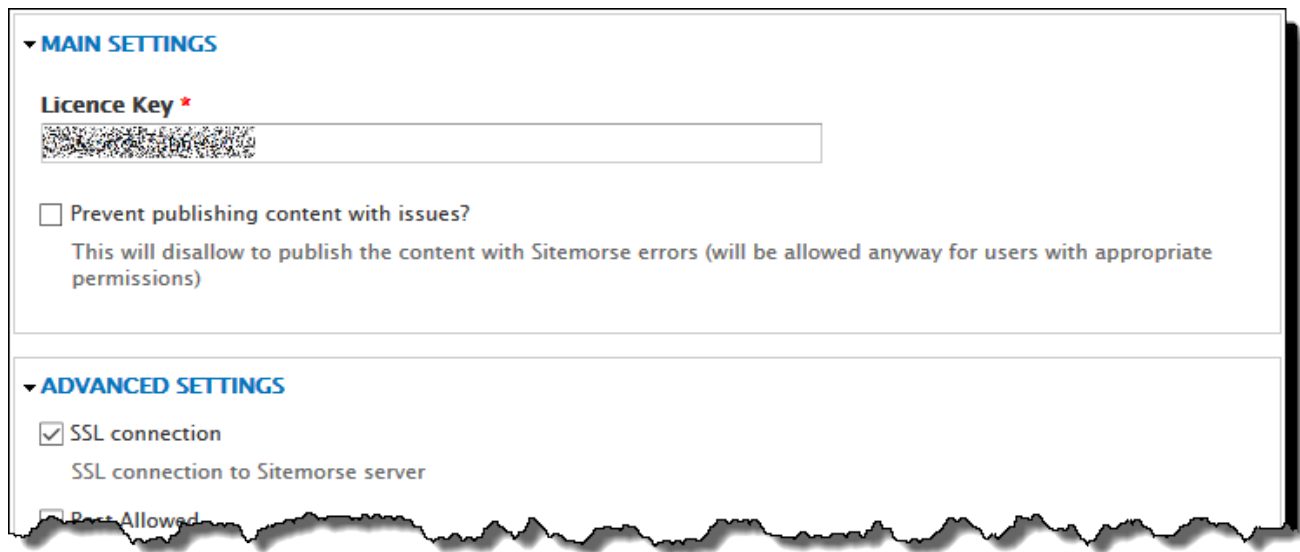


Figure 17 - Setting the Module Configuration Options

## 8 Conclusion

One of the main blockers to the seamless management of content and external assessment of content is the perception that these are two different systems and using two different systems is far more difficult than using just one system. Sitemorse **INCMS™** means the external assessment of content now appears to the content manager as a seamless process.

The design of Sitemorse **INCMS™** offers some key benefits for content managers and administrator of content management systems. It allows users of the system to check the quality of their content but in a way which does not interfere with their work or their regular business processes. Each client module can be tailored to present all the information in a way that is already familiar to the content manager or administrator.

Overarching all the communication between Sitemorse and the customer's CMS is a secure set of messages. This ensures CMS managers can be confident that the possibility of security breaches is kept to a minimum.

Content management and external assessment should no longer be thought of as a nice to have or something for the future. With Sitemorse **INCMS™** these efficiencies are available today.

## 9 Document Control

### Amendment history

Date Issued	Version	Reasons for change
19 April 2017	0.1	Initial draft
20 April 2017	0.2	LJS_comm_add
02 May 2017	0.3	Second draft
03 May 2017	0.4	Third draft - added completing cycle
04 May 2017	0.5	Updates to change and benefits
04 May 2017	0.6	Diagram update
06 July 2017	1.0	Add page priority emails and allocate actions summary
13 February 2018	1.1	Removed get results message
18 June 2020	1.2	Licences with user information

### Distribution list

Name	Organisation/role	Relevant sections

### Related documentation

Reference No	Title	Author	Version and date

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